SHORT REPORTS

Effect of biofeedback on patients' tolerance of fiberoptic bronchoscopy

Fiberoptic bronchoscopy in healthy volunteers has been seen to be tolerated better if the subject watches the procedure through a teaching attachment. We tested this observation in a controlled trial of 50 patients presenting consecutively for fiberoptic bronchoscopy.

Patients, methods, and results

Each of the 50 patients was given papaveretum 10 mg and atropine 0.6 mg before undergoing bronchoscopy and randomised into either the viewing or the non-viewing group. The same bronchoscopist performed all the procedures, addressing all patients from a standard script. The teaching attachment was used from the start of the procedure, held either by the patient or by an assistant, according to the result of the randomisation. The introduction of the bronchoscope and an inspection of the bronchial anatomy of both lungs were undertaken in all patients and explained in the standard script. No reference was made to abnormal findings. The teaching piece was then removed, and the bronchoscopy continued routinely.

Questionnaires about the acceptability of the procedure and patient tolerance^{1,2} were completed by the patient and bronchoscopist independently within one hour of the bronchoscopy. The number of times each patient coughed was counted from a tape recording of the procedure by an observer who was unaware of the patient's group.

There were 23 patients in the viewing group, with a median cough count of 17, and 27 in the non-viewing group, with a median cough count of 23. A Mann-Whitney U test showed a small significant difference between the two groups ($p < 0.05$). Data from the questionnaires were also compared using Mann-Whitney U tests, which showed significant differences between the viewing and non-viewing groups in their assessment of the procedure. The table shows that

Answers recorded on patient and operator questionnaires

	Viewing group	Non-viewing group
<i>Patient questionnaire</i>		
Would you describe the procedure as:		
No bother	8	1
A bit uncomfortable	15	20
Bad		1
Very bad		2
Your worst ever experience		3
Would you have the procedure repeated in:		
The same way	22	17
Under general anaesthesia	1	8
Not at all		2
<i>Operator questionnaire</i>		
Would you assess the patient's tolerance as:		
Unusually good	13	12
Acceptable	9	9
Worse than usual	1	6
So bad as to interfere with the procedure		
Was the degree of coughing:		
Minimal	12	10
Acceptable	9	13
More than usual	2	1
Excessive		3

patients in the viewing group found the procedure more acceptable than those in the non-viewing group, as assessed by question 1 ($p < 0.001$). This finding was confirmed by question 2, which asked by which method patients would choose to have the procedure repeated ($p < 0.01$). There was, however, no correlation between the patients' acceptance of the procedure and the amount they coughed. In contrast, the bronchoscopist's assessment of patient tolerance correlated closely with the number of coughs (correlation coefficient 0.61; $p < 0.001$) but failed to show a significant difference between the viewing and non-viewing groups. There was no correlation between patients' assessment of acceptability and the bronchoscopist's assessment of patient tolerance.

Comment

In this study biofeedback improved patients' tolerance of fiberoptic bronchoscopy as assessed by a patient questionnaire. It did not improve the operator's assessment of patient tolerance. The number of times a patient coughed strongly influenced the operator's assessment of patient tolerance

but did not reflect patients' acceptance of the procedure. Biofeedback seems beneficial to patients not because it reduces coughing but because of some other less readily identifiable factor. These benefits are not, however, shared by the bronchoscopist, as the teaching attachment renders the bronchoscope more cumbersome and reduces the quality of the image. Notwithstanding these limitations, we believe that patients should be encouraged to watch their bronchoscopy through the teaching attachment.

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2 Pearce SJ. Fiberoptic bronchoscopy: is sedation necessary? *Br Med J* 1980;281:779-80.

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Near drowning and hypothermia mimicking severe closed head injury

Assessment of pupillary size and reaction to light are a central part of the examination of unconscious patients. After closed head injury bilaterally dilated pupils that are unresponsive to light are a sign of severe dysfunction of the brain stem. We present a case in which immersion in sea water resulted in near drowning and hypothermia, producing unconsciousness with fixed, dilated pupils that mimicked severe closed head injury.

Case report

A 25 year old man fell from a cliff on to rocks and into the sea. On initial examination he was unresponsive, breathing spontaneously, and exhibiting flexor spasms (Glasgow coma scale V1, E1, M4=6). Both pupils were fixed and dilated with bilateral papilloedema. There were lacerations of the scalp and left shin. The presumptive diagnosis was of severe closed head injury. He was anaesthetised, paralysed, intubated, and ventilated and transferred for a neurosurgical opinion. Both pupils were widely dilated and fixed, and the radial pulse was 60 beats/min with atrial extrasystoles, blood pressure 140/80 mm Hg, and rectal temperature 31°C. There was no skull fracture. Chest radiography showed pulmonary oedema with oxygen tension 8.1 kPa (61 mm Hg) and carbon dioxide tension 5.3 kPa (40 mm Hg). Computed tomography of the head did not show intracranial haematoma or evidence of brain swelling.

The arterial hypoxaemia and pulmonary oedema were attributed to inhalation of sea water. Intracranial pressure measured with a subarachnoid screw was initially 12-18 mm Hg and settled below 10 mm Hg. He was ventilated and passively rewarmed with a foil blanket and warmed humidified gases. Four hours after admission his temperature was 35.5°C, pupils were small and reactive to light, pulse was 70 beats/min (sinus rhythm), blood pressure was 140/80 mm Hg, and intracranial pressure was normal. The pancuronium infusion was stopped; two hours later (eight hours after injury) he was awake and responding appropriately to commands (Glasgow coma scale 15). The inhalation injury resolved with oxygen treatment, physiotherapy, and antibiotics. He was discharged well six days after admission.

Comment

The association of neurological abnormalities and hypothermia is insufficiently emphasised. Mental confusion occurs at 35°C, cardiac arrhythmias and muscle spasms at 33°C, and loss of consciousness with areflexia below about 30°C.¹ Pupillary dilatation occurs at 31°C in half of patients. Papilloedema reflects increased intracranial pressure and is a feature of rewarming rather than hypothermia²; it is unusual in head injury, occurring in only 4% of patients. In severe head injury pupillary abnormalities have been emphasised, as 70% of patients with one or more pupils non-reacting have a score on the Glasgow coma scale of 3-5 (severe head injury). The sign is insensitive as half of patients with a score of 3-5 have normally reacting pupils.³

A skull fracture is associated with an intracranial mass lesion in three quarters of patients.³ Absence of a fracture does not exclude serious head injury: 35% of patients in coma and 20% of those dying after head injury do not have a skull fracture.³ Computed tomography is mandatory for head injured patients in coma (Glasgow coma scale 8), and measurement of intracranial pressure may be useful. Half of head injured patients admitted in coma have a raised intracranial pressure, and intracranial pressure is raised in 30% of cases without haematoma.⁴ Raised intracranial pressure is also a feature of severe near drowning, reflecting the primary hypoxic insult. When the intracranial pressure is greater than 20 mm Hg after near drowning outcome is poor (death in 70% of patients, a vegetative state in 30%).⁵

In our patient attributing the neurological signs to severe head injury led to unnecessary monitoring of intracranial pressure and might have led inexperienced staff to diagnose post-traumatic brain stem failure and withdraw supportive treatment. When examining unconscious patients the core temperature should be measured and clinical signs interpreted accordingly.

- 1 Martin TG. Near drowning and cold water immersion. *Ann Emerg Med* 1984;13:263-73.
- 2 Fishbeck KH, Simon RP. Neurological manifestations of accidental hypothermia. *Ann Neurol* 1981;10:384-7.
- 3 Jennett B, Teasdale GM. *Management of head injuries*. Philadelphia: F A Davis, 1981.
- 4 Miller JD, Butterworth JF, Gudeman SK, et al. Further experiences in management of severe head injury. *J Neurosurg* 1981;54:289-99.
- 5 Nussbaum E, Galant SP. Intracranial pressure monitoring as a guide to prognosis in the nearly drowned, severely comatose child. *J Pediatr* 1983;102:215-8.

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Timing of disc surgery after iohexol myelography and its effect on the incidence of postoperative problems

A recent study by Lynch and Dickson showed a significantly higher incidence of postoperative headache and nausea in patients undergoing discectomy within 48 hours of metrizamide myelography than in those whose operation was delayed for at least a week.¹ Iohexol causes fewer adverse reactions after myelography than metrizamide,² and we believed that this also applied after surgery. We therefore investigated the effect of the time interval between myelography and surgery on the incidence of postoperative problems in patients in whom iohexol had been used as the contrast medium.

Patients and methods

Thirty eight consecutive patients with low back pain and sciatica due to lumbar intervertebral disc prolapse who failed to respond to conservative measures were studied prospectively. Myelography was carried out using iohexol. After the procedure the patients were kept sitting up for six hours and remained on bed rest for at least a further 18 hours (if not operated on within that time).

The disc was subsequently excised through an interlaminar approach with the patient in the knee-elbow position. After the operation the presence or absence of headache, nausea, and urinary retention was recorded each day until the patient was discharged. The timing of the operation was determined solely by the availability of theatre time.

Results

The table shows the number of patients complaining of headache, nausea, and urinary retention on the first day after operation. The results were analysed with the exact probability test using different definitions of the early and late operations.

More patients operated on early had headaches on the first day after operation, but this difference was significant only when early operations were defined in one or other of two ways—namely, those performed on the day after the myelogram ($p=0.027$) or those performed during the first three days after the myelogram ($p=0.046$).

The number of patients with headaches after operation in the early operation group was significantly greater ($p=0.042$) than the number with headaches after

myelography alone (who were awaiting surgery), which suggested that the increased incidence was due to the operation and not simply to the after effects of the myelogram.

Comment

Adverse reactions after myelography are significantly reduced when iohexol rather than metrizamide is used as the contrast medium.² If the contrast study is to be implicated in the production of symptoms in the postoperative period, as suggested by Lynch and Dickson,¹ then the incidence of such symptoms should be reduced by using iohexol in preference to metrizamide. Furthermore, the timing of operations after myelography may be less important in preventing postoperative problems.

Incidence of headache, nausea, and urinary retention on the first day after operation

No of days between myelogram and operation	Total No of patients	No of patients with		
		Headache	Nausea	Urinary retention
1	7	4	2	0
2	4	0	2	0
3	1	1	1	1
4	3	0	0	0
5	5	1	0	1
6	4	0	0	0
≥7	14	1	6	2

Our results show that the only significant difference between patients operated on early and those operated on late was in the incidence of headache on the first day after operation. The headache was not severe in any of the patients, and we do not believe that there is sufficient indication to delay surgery if theatre time is available soon after myelography has confirmed the diagnosis. Such a delay would merely increase the length of time the patient has to suffer sciatic pain.

- 1 Lynch AF, Dickson RA. The relationship of complications to the time between myelography and discectomy. *J Bone Joint Surg* 1983;65B:259-61.
- 2 Kendall B, Schneidau A, Stevens J, Harrison M. Clinical trial of iohexol for lumbar myelography. *Br J Radiol* 1983;56:539-54.

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Ceruletide for retained biliary stones

The incidence of retained biliary stones after exploration of the common bile duct has been reported as 4.3%.¹ Initial therapeutic options include conservative management, perfusion techniques using the T tube, and mechanical means. The use of saline alone to flush out small stones may be successful. Solvents such as cholate or mono-octanoate are more reliable but may have serious side effects.² Stones may be extracted through the matured T tube tract or at endoscopic sphincterotomy, which has been reported to be successful in 85% of patients but is not universally available, may be technically difficult, and has potentially serious side effects.³

We describe our experience of a new perfusion technique that has previously been used successfully in four patients.⁴ Intravenous ceruletide exerts a cholecystokinetic action on the sphincter of Oddi, promoting relaxation and allowing increased volumes of saline to be infused through the T tube to flush out retained stones.

Patients, methods, and results

We have used this technique on 11 occasions in 10 patients over a year (table). All patients except one had undergone cholecystectomy and exploration of the